

Promoting Sustainable Agricultural Systems in Northern Iraq through Revitalized Higher Education and Technology Transfer

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1. Abstract

Beginning in late 2003, the University of Hawaii secured grant funds to build partnerships with several institutions in four provinces of northern Iraq toward establishing centers of excellence in agricultural education, research, outreach, and training to support revitalizing sustainable agriculture in the region. Substantive and substantial progress was, and continues to be made in meeting this goal. Our Iraqi partners have acknowledged the considerable gains from these partnerships and are gradually assuming increasing responsibility for implementing the required enhancements of their agricultural institutions. This has facilitated our efforts to engage in new country-wide initiatives for additional partnerships and attract the necessary financial resources to support them. Because these revitalization efforts involve academic institutions as well as implementation agencies, they will have profound impacts for enhancing sustainable land use and addressing soil and water conservation challenges in the region.

2. Introduction

In a previous report (Jarjees and El-Swaify, 2006) we reported on the early progress under the Agricultural Higher Education and Development Project which joined the University of Hawaii with partner universities in Iraq beginning in late 2003. By the end of 2005, the project had addressed two major objectives, namely:

- Strengthening academic programs in agricultural sciences at the partner Iraqi universities through long and short term training and networking activities aimed at professional development and rebuilding scientific expertise, and
- Providing key enhancements to the deteriorated infrastructure and library resources in support of state-of-the-art teaching and research programs.

3. Objectives

While substantive and substantial progress was and continues to be made in meeting the above objectives, additional priorities emerged with a strong bearing on implementing practical measures for sustainable and conservation-effective agricultural development in Iraq. Highest among these are:

- Strengthening the agricultural extension professionals and programs mandated to advise and deliver technological information to stakeholders; these personnel are managed within Ministries of Agriculture and are administratively separate from university institutions,
- Rehabilitating the infrastructure that supports these programs,
- Building a knowledge clearing house and computer-based, rapid response mechanisms for use in supporting stakeholders through technology transfer, and
- Establishing strategic centers for direct information dissemination and assistance to land users.

The above initiatives are currently focused on the Kurdistan Region of Iraq, comprised of the three governorates of Dohuk, Erbil and Sulaimaniya. They comprise the Kurdistan Agricultural Higher Education and Development (KAHEAD) Project. In addition, two country-wide programs have also been initiated. The first addresses the information needs of provisional Reconstruction Teams in Iraq and is carried out in partnership with the Texas A&M University. The second contributes to a major agribusiness growth program led by the Louis Berger Group.

This paper presents details, updates and specific examples on emerging sustainable land use issues as well as soil and water conservation challenges in the region.

4. Methodology and Approach

Following nearly two decades of isolation from scientific advancements, the highest priority under KAHEAD was placed on a program for short-term (one month) intensive training for joint teams of university faculty and Ministry extension personnel to “refresh” their knowledge base in key natural resource management and agricultural land use topics. To maximize the relevance and cost efficiency of this training, regional partnerships and detailed modular plans were formalized for conducting it at the Egyptian International Center for Agriculture (EICA), the American University of Cairo Desert Research Center (AUC/DDC), the International Center for Agricultural Research in Dry Areas (ICARDA), and the Morocco National Institute for Forestry (ENFI). A total of 66 university faculty and Ministry of Agriculture professionals were selected for this refresher training as follows:

- 10 trainees in soil and water management and conservation (EICA)
- 10 trainees in sustainable forestry and natural resources management (ENFI)
- 8 trainees in plant protection and pest control (EICA)
- 12 trainees in animal husbandry and poultry management (EICA)
- 8 trainees in vegetable horticultural and tree crops (AUC/DDC)
- 18 trainees in field and agronomic crops (ICARDA)

As an illustrative example, Table 1 shows the modular plan for forestry and natural resources training. Figure 1 shows the trainees and instructors in one of the field trips undertaken in this training.

Table 1 Training Plan for Forestry and Natural Resources (ENFI, October 2007)

N°	Module
1	Best management practices for sustainable forestry, forest products and services.
2	Preserving biodiversity and integrated resource conservation
3	Climatic considerations in selecting best adapted vegetation for forestry, range and pasture lands.
4	Ecosystem management and bio-economic models
5	Landscape architecture, ecotourism, and agro-tourism
6	Diagnosing and controlling forest pest and disease infestations
7	Diagnosing and correcting water and nutrient stresses
8	Data collection and database management
9	Technological and equipment innovations for silviculture
10	Opportunities in intercropping and agro-forestry designs
11	Opportunities in utilizing biotechnology
12	Statistics and experimental design for natural systems research
13	Exploring grant opportunities and grants-man-ship
14	Scientific reporting and publication preparation
15	Basic and emerging computer software/applications

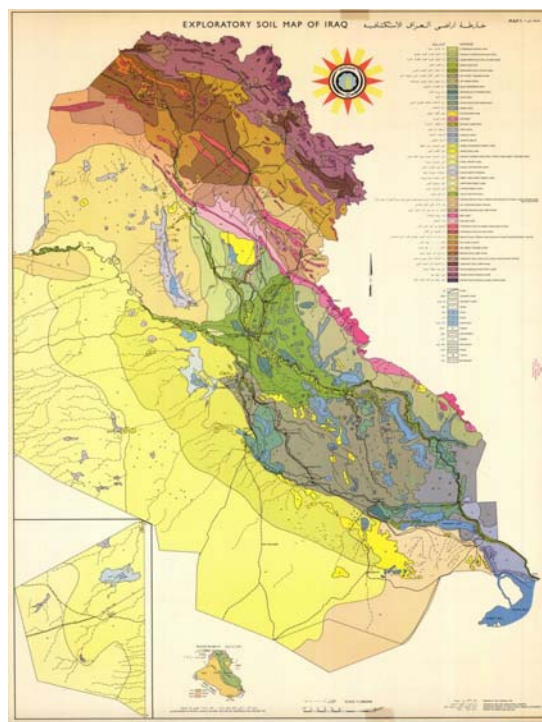


Figure 1 Forestry field trip conducted by ENFI for KAHEAD trainees near Rabat, Morocco

Additional advancements in human capital and infrastructure consist of awarding scholarships for graduate degree training in the U.S., travel grants to international scientific conferences, organizing a leadership workshop for industry analysis and constraints priority setting for institutional administrators, funding of short sabbatical leaves by senior staff and mini-grants for priming innovative research, providing literature search and retrieval services, and enhancement of library resources and electronic communications.

5. Sustainable Resource Management Issues

Although many soil surveys have undoubtedly taken place in Iraq over the years, most could not be found and only the older version shown here, published by FAO could be located (XXXXX, 195??). Dominant soils are typical of those characteristic of dry temperate regions. The climate varies from arid in the south to semi-arid in northern regions. Natural forests have been severely depleted from the country; the few remaining ones are primarily present in northern provinces especially in Kurdistan. Water resources are dominated by the major river systems of Tigris and Euphrates, and their tributaries. One of the earth's most extensive marshlands covers the southeastern corner along the Iran border, and their alteration by massive drainage and upstream damming is acknowledged as requiring major restoration. Desertification is ongoing to varying degrees in cropland, forestland and grazing lands and soil resources. The primary degradation mechanisms are soil salinization in irrigated areas which affects about half of the cultivable lands, and water erosion in hilly regions of the north which contributes significant silt loads to both major rivers. Revitalizing agricultural industries will require concerted efforts of conservation, reclamation and remediation.



**FAO Soil Map of Iraq
(Buringh 1957)**

Enhancing Outreach and Technology Transfer through Building Knowledge Databases and Life-Long Learning Centers (LLLC)

A major distinction between the expired AHEAD project and the current KAHEAD project is the added strong emphasis on delivering scientific and technological information to stakeholders. Recognizing that this task is primarily the responsibility of extension services within the Ministry of Agriculture (MOA), we aimed to identify means of fostering close collaboration between their staff and the faculty at partner universities. All training activities involve a mix of the two, and higher priorities are assigned for mini-grant applications from integrated teams. In addition, several “life-long learning” centers are planned for providing direct services and up-to-date technological information to agricultural stakeholders. These are patterned along the Lifelong Learning Institute and other successful service entities at the University of Hawaii, all of which promote sustained implementation of the land-grant mission. Therefore, KAHEAD will install:

- **Agricultural Diagnostic Services Centers (ADSC)** to serve growers and urban dwellers by testing soils, crops, and irrigation water, and prescribing optimal management and/or corrective measures for maximum farm productivity, conservation and economic benefits.
- **Operational Scale Demonstration Farms (OSDF)** to serve as “models” where improved technologies are applied at a realistic scale that goes beyond conventional “research plots”. Here, stakeholders can observe and critique promising technological innovations, particularly in the areas of land, water and environmental management preferably, on a watershed scale for integrated sustainable agriculture.
- **On-Farm Demonstration Sites** for applying pilot technologies
- **Public Information and Farmer Education Centers** to provide printed and electronic educational materials, group lectures, conduct focus groups for collecting public comments, and provide interactive computer and internet access in a welcoming setting conducive to mutual learning.

Ultimately, the Centers for Life Long Learning are intended to serve as epicentres of rural development and economic growth. In addition, they will stimulate investment in regional agricultural industries by

attracting returning residents, entrepreneurs and new investors to rural areas. To provide scientific backstopping, build the needed cadre of trained personnel, and enhance the skill level of present and future field-based agents, a ***Department of Extension and Outreach Education*** will be established at CA/USAL. The department's curricula and courses will be designed collaboratively by CA/USAL, MOA, UHM/CTAHR and neighbor country partners. The highly trained graduates of this department will be responsible for transferring new technologies to stakeholders that fuel economic development and protect natural resources.

6. Addressing Fundamental Research and Policy Making Needs

Although KAHEAD's short term plans are intended to focus on meeting present and immediate practical needs, it is recognized that a strategy is also needed to address those needs that will emerge in the future and support the functions carried out by LLLC's. Two complementary components have been planned:

- ***Central Agricultural Strategic Research and Biotechnology Laboratory*** that is well-equipped to serve fundamental agricultural research needs. It will network with domestic and international institutions, private companies, and investors to develop appropriate advanced technologies and products for promoting science-based agricultural development in the region. The Center's "strategic" research will address knowledge gaps identified by Ministry and University specialists.
- ***Center for Database Management and Agricultural Policy*** To serve as a primary source of information needed by decision makers in the development of regional agriculture. It is intended to provide timely advice to the MOA and other agencies by acting as a clearing house for existing data, a collector of new data, a locus of policy analysis, leadership, and entrepreneurship training; and a vehicle for interfacing with international development agencies. The center will also sponsor annual conferences on topical issues of importance to sustained economic development.

7. Conclusions

As a four year project, KAHEAD is expected by completion to have a profound impact on agricultural education and outreach institutions of Kurdistan, and strongly enhance economic development in the region.

8. References

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